

## **Rise in Sea Levels**

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### **Greenhouse Effect on Sea Levels**

- The rise in sea levels is directly tied to global warming. Specifically, ocean levels are rising because of the greenhouse effect.

### **Greenhouse Effect**

Similar to the glass of a greenhouse, gases in our atmosphere trap the sun's heat. They allow the sun's rays to pass through the atmosphere to warm the earth and then prevent this warmth from escaping. This is very important, as without naturally occurring, heat-trapping gases, Earth would be too cold to sustain life.

The problem lies in the excess of carbon dioxide and other greenhouse gases that have been released into our atmosphere and intensify the natural greenhouse effect. This results in an increase of global average surface temperatures- including our water bodies.

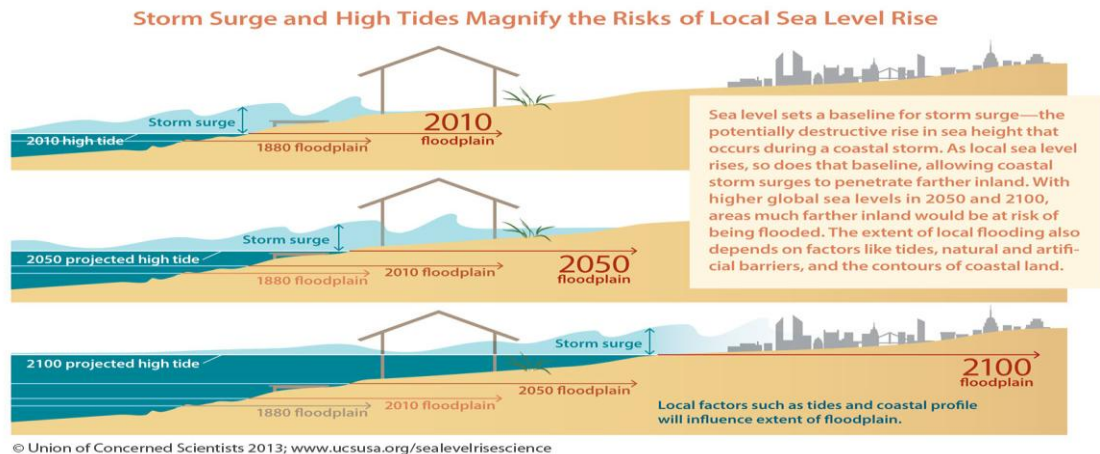
### **Reasons the Sea Level is Rising:**

- 1) Thermal Expansion: Oceans are rising due to global warming because rising temperatures are warming the ocean waters, which expand as the temperature increases. In fact, half of the past century's rise in sea levels is attributed to warmer oceans occupying more space. The sea level rises approximately 0.12 inches per year.
- 2) Melting of Glaciers, ice caps, and ice sheets: Large ice formations, such as glaciers, polar ice caps, and ice sheets, naturally melt from increased temperatures in the summer. This is usually sufficiently balanced by snows made from evaporated seawater in the winter. However, because of global warming there have been increases of temperatures that have led to greater-than-average summer melting and less snowfall. The heightened runoff from this imbalance has caused sea levels to rise.

### **Consequences of Sea Levels Rising:**

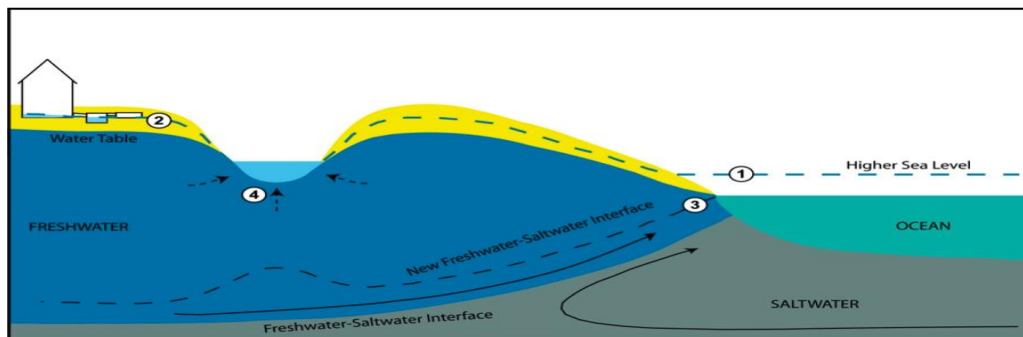
#### **Coastal Area Impacts**

- The rise in sea levels threatens coastlines and the ecosystems, wildlife, cities, and people located along them
- Millions of people all around the world live in low-lying areas near the coast that could be flooded as the sea level rises. (For example, cities like Miami, New York City, New Orleans, and Venice are all at risk of flooding)
- If levels continue to rise, many people will lose their homes, businesses, and even their lives



### Fresh Water Impacts

- Salt- water intrusion will reduce the quality and quantity of freshwater supplies
- The salt water will seep into our freshwater resources due to it's growth
- The rise in sea levels are already contaminating underground water in Israel and Thailand



### Economic Impacts

- A great deal of food is produced in coastal areas, making fisheries, aquaculture, and agriculture oriented businesses vulnerable to damage from rising sea levels
- Tourism and insurance businesses are also at risk (insurance will have to pay for more damage and tourists will no longer find the places suffering from the damage appealing)

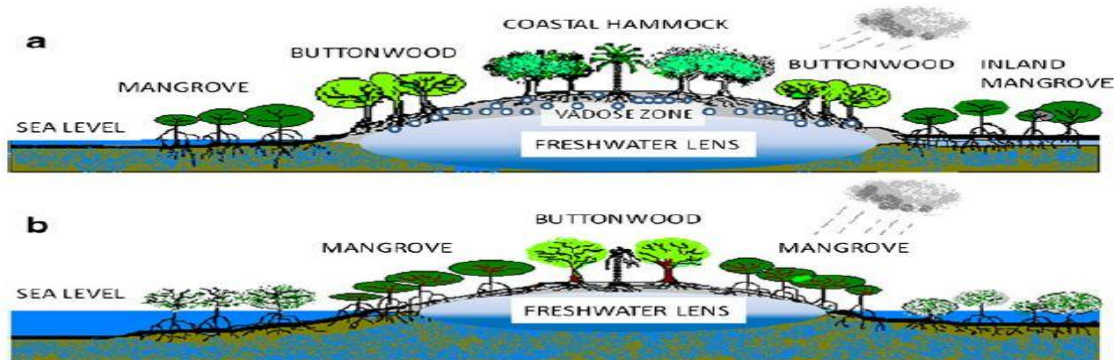
### Human Health Impacts

- The displacement of flooded communities would increase the risk of various infections and illnesses
- Insects and other transmitters of disease could spread to new areas

- The damage (as a result of floods or storms brought on by rising sea levels) to man-made systems for sanitation, storm-water drainage, and sewage disposal would also have health-implications

### Ecosystem Impacts

- Important ecosystems along coastal areas, containing some of the world's most diverse forms of wildlife are in danger of being either damaged or even destroyed by rising seas
- The declining Arctic and Antarctic will also result in a decline of ecosystems and wildlife



### Storm Impacts

- With tides and storms riding in on higher seas, the frequency and power of storm surges will increase
- It also increases the odds of damaging floods from the storm surges



### What Will Happen in the Future?

- By the year 2100, the sea level is expected to rise between 2.5 and 6.6 feet
- More dire estimates, put sea level rise at 23 feet
- For a warming of 3 degrees, up to 12 countries, mainly small island states, would lose more than half their land surface and 7% of the population would live in areas that become below sea level

- If sea levels continue to rise, Florida, Bangkok, London, New York, Shanghai, and Mumbai will be below sea level

### **Solutions**

- The simplest and most direct solution of rising sea levels, is reducing greenhouse gas emissions
- A study by the Scripps Institution for Oceanography, NCAR, and Climate Central, says reducing emission of certain pollutants can prevent the rate of sea level rise by approximately 25 to 50 percent
- Specifically, we should reduce four pollutants in particular: methane, tropospheric ozone, hydro fluorocarbons, and black carbon
- This would require us as an entire population to cut back on motor vehicle exhaust, industrial emissions, chemical solvents, and anything else that creates smoke or soot
- We should eliminate the need to burn fossil fuels for energy immediately and instead turn to more environmentally friendly means of energy production like solar panels, wind turbines, and hydroelectricity

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